

Title

## **One-Hand Operational Control Device of Foldable Stroller**

Cross Reference of Related Application

5 This application is a Continuation-In-Part of a non-provisional application,  
application number 10/035,703, filed October 18, 2001.

Background of the Present Invention

### **Field of Invention**

10 The present invention relates to strollers, and more particularly to a one-hand  
operational control device for a stroller to improve both its safety and operability. The  
folding process of the stroller includes a simple and practical single-action operation by  
an adult's hand.

### **Description of Related Arts**

15 A stroller is considered as a transportation tool to carry the baby or young child  
during outdoor activities such as walking and shopping. For convenience, the stroller is  
preferred to be quickly and easily unfolded for use and folded into a compact unit for  
carriage so that a user can carry the stroller everywhere.

20 Referring to Fig. 1, a conventional foldable stroller comprises a supporting  
frame, a seat frame pivotally supported by the supporting frame, and a U-shaped handle  
frame pivotally extended from the supporting frame. The foldable stroller further  
comprises a locking control device for selectively locking and unlocking the stroller in its  
unfolded position.

25 As shown in Figs. 1 and 2A-2D, the locking control device A20 comprises a  
pair of first locking members A21 provided at two end portions of the handle frame, a  
pair of second locking members A22 provided on the supporting frame, and an operation  
unit A30 comprising a turn switch A31 rotatably mounted on the handle frame and a

thumb pusher A32 movably mounted on the turn switch A32 in a vertical movable manner, as shown in Fig. 1. Figs. 2A-2D illustrate different kinds of the first and second locking members A21, A22, B21, B22, C21, C22, D21, D22 of the locking control device A20, B20, C20, D20 for the conventional foldable stroller.

5           In order to unlock the foldable stroller, the user must intentionally press the thumb pusher A32 downwardly by his or her thumb and rotate the turn switch A31 backwardly simultaneously so as to drive the first locking members A21 to be disengaged with the second locking members A22. Therefore, the user can push the handle frame forwardly to fold up the foldable stroller.

10           However, such a locking control device has a major drawback in that the user must use his or her thumb to depress the thumb pusher and turn the turn switch by his or her hand at the same time. Due to the muscular structure of the human body, when the user's thumb presses on the thumb pusher, especially for women, the wrist of the user becomes too tense to turn downwards to rotate the turn switch. Similar operational  
15           problem occurs when the user has to rotate the turn switch backward and push the handle frame forward in order to fold up the stroller at the same time. Therefore, the user is difficult to operate the two actions of the locking control device at the same time. In other words, the operation of the locking control device is considered disadvantageous in practical use. When the user operates the locking control device improperly, an  
20           unwanted injury to the user, such as twisting his or her wrist, may be resulted.

### Summary of the Present Invention

          A main object of the present invention is to provide a one-hand operational control device of foldable stroller wherein the stroller is improved both in safety and operability. The operation of the device is smooth and easy since it is designed to fit the  
25           muscular structure of the human body.

          Another object of the present invention is to provide a one-hand operational control device of foldable stroller wherein the folding process of the foldable stroller includes a simple single-action operation by an adult's hand, wherein the user's thumb push-down operation is avoided and substituted simply by a gripping action with the

user's hand that will not block the user's wrist and enables the user's hand to smoothly rotate frontward in order to unlock the stroller.

Another object of the present invention is to provide a one-hand operational control device of foldable stroller which can be quickly and easily folded into a compact unit for carriage and storage and unfolded for use.

Another object of the present invention is to provide a one-hand operational control device of stroller, in which the original structural design of the stroller does not need to be modified, so as to minimize the manufacturing cost for incorporating the one-hand operational control device with the every conventional stroller having a handle frame.

Accordingly, in order to accomplish the above objects, the present invention provides a foldable stroller, comprising:

a foldable supporting frame;

a handle frame comprising two tubular pivot arms extending downwardly;

a pair of folding joints for pivotally connecting two lower ends of the pivot arms to two sides of the supporting frame respectively;

an engagement unit comprising a pair of first engaging members provided at two lower ends of the pivot arms of the handle frame respectively and a pair of second engaging members provided at the two folding joints and securely engaged with the two first engaging members respectively, so as to lock up the handle frame with respect to the supporting frame; and

a one-hand operational control device, comprising:

a turn switch comprising a central shaft, having a pusher cavity, firmly and coaxially mounted between two upper ends of the two pivot arms and a turning handle, having a guiding slot, rotatably mounted on the central shaft and arranged to drive the first engaging members disengaged with the second engaging members respectively when the turn switch is rotated with respect to the pivot arms;

5 a locking unit comprising a locking latch disposed in the pusher cavity of the turn switch in a slidably movable manner and a finger trigger extended from the locking latch to the outside through the guiding slot, wherein the locking latch is arranged to be driven by the finger trigger to move from a normally locking position to an unlocked position; and

10 a resilient unit which is disposed in the pusher cavity for applying an urging pressure against the locking latch so as to normally retain the locking latch at the locking position, wherein in the locking position, a locking portion of the locking latch is extended outwardly to block the turn switch from being rotated with respect to the pivot arms so as to lock the foldable stroller from being folded up, and that in the unlocked position, the locking portion of the locking latch is moved away from the turn switch so as to release the blocking up of the turn switch with respect to the pivot arms, so that the turn switch is capable of being rotated to disengage the first engaging members with the second engaging members in order to fold up the stroller.

## Brief Description of the Drawings

Fig. 1 is a perspective view of a conventional foldable stroller.

Fig. 2 is a perspective view of a locking control device for the conventional stroller.

5 Fig. 3 is a perspective view of a foldable stroller incorporated with a one-hand operational control device according to a preferred embodiment of the present invention.

Fig. 4 is a sectional perspective view of the foldable stroller incorporated with the one-hand operational control device according to the above preferred embodiment of the present invention, illustrating the folding operation of the foldable stroller.

10 Fig. 5 is an exploded perspective view of the one-hand operational control device of the foldable stroller according to the above preferred embodiment of the present invention.

Fig. 6 is a sectional view of the one-hand operational control device of the foldable stroller in a normally locking position according to the above preferred embodiment of the present invention.

15 Fig. 7 is a sectional view of the one-hand operational control device of the foldable stroller in an unlocked position according to the above preferred embodiment of the present invention.

## Detailed Description of the Preferred Embodiment

Referring to Fig. 3 of the drawings, a foldable stroller equipped with a one-hand operational control device 2 according to a preferred embodiment of the present invention is illustrated. The foldable stroller 1, such as a standard foldable stroller,  
5 comprises a foldable supporting frame 11, a handle frame 12 comprising two tubular pivot arms 121 extending downwardly, and a pair of folding joints 13 are arranged for pivotally connecting two lower ends of the pivot arms 121 to two sides of the back frame 112 of the supporting frame 11, respectively. The foldable stroller 1 further comprises an engaging unit 20 for securely locking up the handle frame 12 with respect to the  
10 supporting frame 11.

The supporting frame 11 comprises a front frame 111, a back frame 112 pivotally connected to the front frame 111, and a seat frame 113 pivotally supported by the front and back frames 111, 112. In order to fold up the foldable stroller 1, the handle frame 12 must be pivotally and forwardly moved to the supporting frame 11, so as to fold  
15 up the back frame 112 towards to the front frame 111.

The engagement unit 20 comprises a pair of first engaging members 21 provided at two lower ends of the pivot arms 121 of the handle frame 12 respectively and a pair of second engaging members 22 provided at the two folding joints 13 and securely engaged with the two engaging members 21 respectively, so as to lock up the handle  
20 frame 12 with respect to the supporting frame 11.

As shown in Figs. 4A, 4B and 5, the one-hand operational control device 2 comprises a turn switch 30, a locking unit 40, and a resilient unit 50.

The turn switch 30 comprises a central shaft 31, having a pusher cavity 311, coaxially mounted between two upper ends of the two pivot arms 121 and a turning  
25 handle 32, having a guiding slot 321, coaxially and rotatably mounted on the central shaft 31, wherein the turn switch 30 is arranged to drive the first engaging members 21 to disengage with the second engaging members 22 respectively when the turn switch 30 is rotated with respect to the pivot arms 121, as shown in Figs. 4A and 4B.

The locking unit 40 comprises a locking latch 41 perpendicularly disposed in the pusher cavity 311 of the turn switch 30 in a slidably movable manner and a finger trigger 42 extended from the locking latch 41 to outside through the guiding slot 321, wherein the locking latch 41 is arranged to be driven by the finger trigger 42 to move from a normally locking position to an unlocked position.

The resilient unit 50 is disposed in the pusher cavity 311 for applying an urging pressure against the locking latch 41 so as to normally retain the locking latch 41 in the locking position. In which, in the locking position, a locking portion of the locking latch 41 is extended outwardly to block up the turn switch 30 from being rotated with respect to the pivot arms 121 so as to lock the stroller 1 from being folded up, and that in the unlocked position, the locking portion of the locking latch 41 is moved away from the turn switch 30 so as to release the blocking up of the turn switch 30 with respect to the pivot arms 121. Therefore, the turn switch 30 is capable of being rotated to disengage the first engaging members 21 with the second engaging member 22 in order to folding up the stroller 1.

According to the preferred embodiment, the engagement unit 20 further comprises at least an elongated element 23 and a pair of auto-returning elements 24 for applying an urging pressure against the first engaging members 21 to normally engage with the second engaging members 22 respectively.

The elongated element 23 has a middle affixing portion 231 coupled with the turning handle 32 of the turn switch 30 and a control end 232 firmly connected to the respective first engaging member 21 in such a manner that when the turning handle 32 is rotated with respect to the central shaft 31, the first engaging members 21 are disengaged with the second engaging members 22 respectively via the elongated element 23, as shown in Figs. 4A and 4B.

As shown in Figs. 4 and 5, the central shaft 31 further has two windows 312 formed thereon to communicate an interior of the central shaft 31 with outside, wherein the two control ends 232 of the elongated element 23 are extended into the interior of two end portions of the central shaft 31 via the windows 312 and inserted through the pivot arms 121 to engage with the first engaging members 21 respectively. In other words, the control ends 232 of the elongated element 23 pass through the windows 312 and the pivot arms 121 to reach and engage with the first engaging members 21 respectively.

Each of the auto-returning elements 24, which is a resilient element such as compression spring, mounted between the first engaging member 21 and the pivot arm 121. The auto-returning element has two ends biasing against the first engaging member 21 and the pivot arm 121 so as to push the first engaging member 21 to a position that the  
5 first engaging member 21 is engaged with the second engaging member 22.

The turning handle 32 is coaxially and rotatably mounted on the central shaft 31 and has a size and shape adapted for being fittedly gripped by a hand of a user to rotate the turning handle 32 with respect to the pivot arms 121. The turning handle 32 further has at least a blocking wall 322 inwardly extended from an inner surface of the turning  
10 handle 32 towards to the pusher cavity 311.

The turn switch 30 further comprises a driving member 34 rotatably connected to the central shaft 31, wherein the driving member 34 has at least a protrusion 341 extended outwardly and engaged with the turning handle 32 so as to ensure the turning handle 32 being rotated with respect to the central shaft 31. The central shaft 31 can be  
15 integrally extended between two ends of the pivot arms 121 of the handle frame 12 to form a one-piece member, so as to rigidly support the turning handle 32 in a rotatably movable manner.

According to the preferred embodiment as shown in Figs. 4A, 4B and 5, the middle affixing portion 231 is attached to the driving member 34 so as to couple with the  
20 turning handle 32.

Alternatively, the elongated element 23 can be two durable wires each having an affixing end connected to the driving member 34 and another end functioned as the control end 232 extending from the central shaft 31 to the respective first engaging member 21 and passing through the respective pivot arm 121. It is worth to mention that  
25 the two affixing ends of the two durable wires or the middle affixing portion 231 of the elongated element 23 of the preferred embodiment can be substantially affixed to the driving member 34 so as to drive the first engaging members 21 to disengage with the second engaging members 22 respectively.

As shown in Figs. 4A and 4B, the turning handle 32 must be rotated forward in  
30 order to drive the first engaging members 21 to disengage with the second engaging members 22 via the elongated element 23 respectively while folding up the foldable



stroller 1. In other words, the forward rotational operation of the turn switch 30 has the same direction of the forward folding operation of the handle frame 12 so as to enhance the folding operation of the foldable stroller 1.

5 According to the preferred embodiment, the locking latch 41 is slidably fitted in the pusher cavity 311 in a perpendicularly movable manner with respect to the central shaft 31 and an outer end of the locking latch 41 functions as the locking portion. In the normal locking position, the outer end (locking portion) of the locking latch 41 is normally extended towards the blocking walls 322 of the turning handle 32 in order to block the turning handle 32 from being rotated with respect to the pivot arms 121.

10 As shown in Figs. 6 and 7, the pusher cavity 311 has a predetermined depth and the locking latch 41 is pushed inward enough to move away from the blocking wall 322 of the turning handle 32.

The resilient unit 50, according to the preferable embodiment of the present invention, comprises at least a compression spring which is disposed in the pusher cavity 15 311 and is provided between a bottom surface of the pusher cavity 311 and the locking latch 41. The resilient unit 50 has two ends biased against the locking latch 41 and the bottom surface of the pusher cavity 311. Accordingly, the resilient unit 50 will normally urge and retain the locking latch 41 in an outer position that the outer end of the locking latch 41 is extended to the blocking wall 322 of the turning handle 32 to block the turning 20 handle 32 from being rotated with respect to the pivot arms 121, so as to lock the foldable stroller from being folded up.

The finger trigger 42 is slidably mounted on the turning handle 32 through the guiding slot 321 and arranged to inwardly move the locking latch 41 into the pusher cavity 311 until the outer end of the locking latch 41 is moved away from the blocking 25 wall 322 of the turning handle 32. For enhancing the operability of one-hand operational control device 2, the finger trigger 42 has a W-shape to form a W-shaped gripping surface 421 for the user's fingers fittedly gripping thereon.

In order to unlock the one-hand operational control device 2, the user must intentionally grip the finger trigger 42 by his or her fingers and apply an inward force  $F1$  30 on the finger trigger 42 in order to inwardly move the locking latch 42 until the outer end of the locking latch 42 is moved away from the blocking wall 322 of the turning handle

32. In this unlocked position, a forward rotational force F2 can be applied on the turning handle 32 to rotate forward to drive the first engaging members 21 to disengage with the second members 22 respectively. Therefore, the user can pivotally push the handle frame 12 towards to the supporting frame 11 to fold up the foldable stroller 1. According to the human body structure, the user can easily grip on the finger trigger 42 to press it inward, rotate the turn switch 30 to unlock the foldable stroller 1, and push the handle frame 12 to fold up the foldable stroller 1 in a single continuous motion.

While releasing the forward rotational force F2, the auto-returning element 24 will rebound to its original form which rotatably pushes the turning handle 32 rearwardly to the original position. Furthermore, the compressed resilient unit 50 will then rebound outwardly and force the locking latch 41 to extend to the blocking wall 322 of the turning handle 32, so as to remain the locking latch 41 in its original lock-up position.